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All too soon we have to turn our faces homeward to the serious side of life.

Now as a matter of fact, all our camping places can be reached by wagon road, so if one could not get there by water, or did not care to, the outfit could be sent by wagon, but it adds zest and romance to the expedition to make believe you are far from the haunts of man.

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### **SOME RECENT ADVANCES IN MEDICAL SCIENCES \***

By JOHN A. KOLMER, M.D.

Professor of Pathology, Philadelphia Polyclinic; Instructor in Experimental Pathology, University of Pennsylvania; Pathologist to the Philadelphia Hospital for Contagious Diseases.

THE past few years have been quite fruitful in the development of problems relating especially to the cure and prevention of disease. Because of the close relationship of the medical and nursing professions, it is necessary for the latter to keep abreast of any new and practical advancements. The frequent opportunity afforded the nurse in the line of preventive medicine renders it necessary for her to have an understanding of recent progress. Through the medium of the newspaper and periodical the laity are frequently given early information regarding some discovery, and naturally they expect both physician and nurse to be able to express a careful and intelligent opinion.

At no period in the history of medicine has there been more research activity than at the present time. Splendid institutions are being erected and endowed for special work, and new knowledge is being quickly gained and advanced along practical lines for a better understanding and treatment of disease.

While many important discoveries have been made in the past few years there are two which stand out because of their important significance: vaccination against typhoid fever, and chemotherapy. The former marks a great step in the prevention of a dreaded disease and the latter opens up a new therapeutics of vast possibilities.

*Antityphoid Inoculation.*—The conception of prevention in typhoid fever by means of a vaccine is based upon the original experiments of Pfeiffer and Kolle, two German investigators, as early as 1896. The method, however, has been popularized by Sir Almroth Wright in England and in this country through the army, by Major Russel.

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\* Address delivered before the Philadelphia Club for Graduate Nurses, January 7, 1913.

Despite the fact that the bacillus causing typhoid fever was discovered many years ago and means whereby healthy persons are infected are well known, the disease still claims a heavy toll of human life each year. Sanitation has improved the condition very much, as better water and milk supplies and better care of sewage and especially disinfection of excreta of the typhoid patient have gone far toward reducing the number of persons infected, but we still have the clinically unrecognized case to deal with, persons not sick enough to go to bed but yet dangerous because of the infected excreta; also there is the danger of direct contact with one sick of typhoid, and there is always the danger of the disease being brought into our midst by a visitor from some town or locality where the disease is prevalent. All of these factors make some additional means of protection advisable and welcome. If all the excreta from every case of typhoid fever were efficiently disinfected, the disease would soon disappear, but this is not possible at the present time. Continued improvement in sanitation, with more wide-spread use of the typhoid prophylactic or vaccine, will gradually eradicate typhoid fever from our midst.

Typhoid vaccine, better termed "bacterin," is composed of typhoid bacilli suspended in salt solution and killed by heating at a certain temperature for a definite period of time. The bacterin is then standardized by counting the bacilli, and a preservative added. At present this prophylactic is placed upon the market in special syringes or ampoules, each containing the proper dose. The bacilli themselves are dead, in the sense that they cannot reproduce, but when correctly prepared are able to stimulate our own body cells to produce an antibody specific against the typhoid bacillus. In other words, as a result of injecting the bacterin, antibodies are formed which prevent the growth of typhoid bacilli should we become infected. By this process of vaccination we are prepared beforehand to resist the typhoid bacillus; our defences are so strengthened that the invader cannot survive and we thereby escape the disease.

Vaccination against typhoid fever is somewhat analogous to vaccination against smallpox. In the latter the germ or virus is so modified by passing it through the cow that it cannot give true smallpox, but is able to stimulate body cells to produce the specific antibody to smallpox so that we escape the infection. In the case of typhoid bacterin the germ is modified by heating so that we cannot contract typhoid fever from its use, but are yet protected in the manner given above. Therefore the only really legitimate opposition to the use of typhoid bacterin

is the discomfort of administration, which is quite insignificant to the benefits derived.

The bacterin is not rubbed into an abrasion on the arm as in cow pox virus, but must be injected subcutaneously, not intramuscularly. The technic of administration, therefore, is quite simple, and consists briefly of sterilizing a patch of skin with tincture of iodine near the insertion of the left deltoid muscle and injecting the prescribed dose with a sterile syringe. Three doses, at weekly intervals, are necessary to secure the proper immunity. After administration, a dressing containing some evaporating lotion, and a bandage may be applied to control any pain. As a rule, this dressing is not necessary.

Following the administration of the first dose of bacterin there may be slight headache and discomfort and in exceptional instances a slight chill. These effects are especially noticeable in the debilitated. Persons who are hale and hearty may not experience any ill effects at all. About the site of injection a painful area of swelling and redness may develop and the neighboring lymphatic glands become large and tender, but these subside in 48 hours. Under proper precautions abscess formation is very uncommon indeed. The second and third doses are usually free from any ill effects. According to Dr. Spooner, who has administered the bacterin to a large number of nurses and other persons in the hospitals of Massachusetts, 86 per cent. of persons have slight or no unpleasant reactions; in 10 per cent. the reaction is moderate—malaise, headache and mild fever; in only 4 per cent. is the reaction of a more severe nature. It is recommended that the inoculation should not be done on the eve of catamenia or during the early days of the flow.

Until recently it was regarded by some as dangerous to administer the prophylactic to those exposed to typhoid fever for fear of producing a "negative phase" during which the person was considered for a brief time to be more susceptible, but this is probably untrue and recent work would indicate that instead of being rendered more susceptible, immunity is induced almost at once. This is well demonstrated by administering the bacterin with good results to persons in intimate contact with typhoid fever patients, as physicians, hospital nurses, and attendants.

Statistics have now accumulated which prove quite conclusively the efficacy of inoculation against typhoid fever. A few of these may be illustrative and not devoid of interest. During the Spanish-American War, 10,759 troops were mobilized in Jacksonville, Florida. Among these troops there developed 1729 cases of typhoid fever, and including

cases more doubtful the number reached 2693 with 248 deaths. In marked contrast note that last year about 20,000 men were assembled in Texas and California along the Mexican line; all of these soldiers received the typhoid prophylactic either before reaching camp or shortly after; the camp lasted about the same length of time as the Jacksonville camp in 1898; both camps were situated in about the same latitude and furnished with artesian well water—yet in contrast to the more than 2000 cases of 1898 there were but two mild cases and no deaths in 1911! It is true that the sanitary arrangements of the 1911 encampment were much better, but the men were permitted to mingle pretty freely in the neighboring towns where typhoid fever was prevalent and were exposed in this way to the same dangers as the citizens.

In twenty-three of the hospitals of Massachusetts the nurses and others intimately exposed to typhoid fever, numbering 1585 individuals, have received the prophylactic. The number of cases of typhoid fever among these was eight times less as compared to the number of cases developing among 1361 persons not inoculated.

Statistics of those in civil life are not easily obtained, but wherever the prophylactic has been given there are numerous incidences indicating the efficacy of the treatment. Many state and city boards of health are making and distributing the prophylactic free of charge and urging its administration, especially in institutions.

Antityphoid vaccination is of the greatest value in affording protection against typhoid fever for a period of at least two or three years. Its administration is especially desirable to those intimately exposed to the disease, as nurses and members of a family where the infection is present. We agree with those who consider that authorities in charge of institutions who do not urge this prophylactic are negligible in the extreme. It is certain that this method of inoculation is the only means of offering most protection and that most likely to be effective amidst unfavorable surroundings.

*Chemotherapy.*—This term, in a strict sense, means the treatment of disease by means of chemical agents. In this respect it is not a new therapy by any means, as chemical combinations have been used for hundreds of years in the treatment of disease. The term is understood, however, to apply more specially to treatment of disease by means of synthetical compounds or chemicals artificially built up from simpler substances and their value determined experimentally. Ever since the discovery of bacteria and the establishment of their relation to disease, it has been the hope and dream of medical men that some substances

would be found or made which would destroy germs in the body as one may destroy them in the test tube or in excreta by adding what is known as a germicide. If this could be accomplished it would then be possible to cure disease by actually destroying the germs in the diseased body. But there are great difficulties to be solved, for while it is possible to administer a substance so powerful as to kill germs in the body, yet at the same time it would kill body cells and destroy the life of the patient. Therefore it was necessary to discover or make a substance which would have a selective action on the invading organisms and leave the body cells unharmed. Professor Ehrlich of Germany has been working along these lines for many years and after trying over 600 preparations of arsenic at last perfected one which, when injected into lower animals, would completely destroy all the organisms producing their disease, without harming the body cells. This drug is popularly called "606" or salvarsan, and is now used with success the world over in the treatment of syphilis. This means a great step in a new field and blazes the way for more research and advancement.

Salvarsan is a yellowish powder and readily soluble in water. It is placed on the market in sealed ampoules and should not be opened until ready for administration, for after exposure to the air it becomes oxidized and toxic in effect. Salvarsan is usually administered intravenously after dissolving the powder in sterile saline solution made of distilled water and neutralizing the solution with sodium hydrate solution. It is apt to cause considerable pain or discomfort when injected subcutaneously or intramuscularly. Lately Ehrlich has improved his remedy so that it is very easy of administration, being dissolved in sterile saline solution and administered intravenously according to the normal technic of such injections.

After administration the patient may not experience any ill effects beyond those due to the injection of so much saline solution. In some instances there is a slight chill, congestion about the head, profuse sweating, and a moderate temperature. It is essential that the solution be properly prepared and with freshly distilled water, as some of the bad effects may be due to the water used in making up the solution.

The drug has certain contra-indications and cannot be given promiscuously.

At first it was hoped that a single dose would serve to sterilize the body and destroy the infection at once and completely. This result has been obtained in treating lower animals and has occurred likewise in some human cases of syphilis, but as a rule it is better practice to give

several smaller doses. The effect of the drug is usually startling and most effective. Primary and secondary lesions of syphilis rapidly disappear, while older lesions yield more slowly.

The discovery of salvarsan was the result of logical reasoning and much experimentation. It was not a pure accident. Therefore it opens a new and vast field. For many years physicians knew of only two specific drugs: mercury in syphilis and quinine in malaria. It was not known how they cured, but at present we know that they have a direct poisonous effect upon the parasites causing those diseases. The treatment of bacterial diseases with similar preparations will offer more difficulty, but salvarsan means such a tremendous stride in this direction that we can confidently expect more discoveries with an increasing number of specific drugs in the treatment of disease.

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## PATIENTS' CRITICISM OF NURSES

BY A. D., R.N.

MANY nurses are criticized severely by patients and the public, sometimes justly, sometimes unjustly, not only for the lack of ability in caring for the sick, but for their character, manner, and personal appearance. We all know in nursing, as well as in other professions, there are all classes to be found, yet it does seem that women who take up nursing should help to ennoble the calling rather than disgrace it, as a great many nurses are doing throughout the United States. The hospitals from which these so-called nurses are graduated are greatly at fault, for so many inferior, uneducated women are being forced upon the public at large as graduate nurses.

Not long ago a friend called my attention to a graduate nurse who had been her cook three years previously. Do not misunderstand my meaning in regard to cooks, there are a great many refined women earning their daily bread in this way, but this one was far from being refined, for while employed by my friend, she was found to be dishonest, untruthful, a gossip, and without the rudiments of a common-school education. This girl did not like cooking and thought she would take up something easier, and some hospital graduated her as a nurse. Did that hospital look into her past history? Were its educational requirements up to the standard? If so, why was this pupil accepted and graduated? Not until all hospitals are required to be registered, and state registration for nurses made compulsory, will such inferior nurses be debarred from imposing on the public.